Bureau of Standards
JUL 11 1923

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DEPARTMENT OF COMMERCE
BUREAU OF STANDARDS
WASHINGTON

Technical News Bulletin No. 75

July 10, 1923.

GENERAL NOTE

Owing to the current nature of the investigations mentioned in the Technical News Bulletin, sometimes it will be impossible to supply printed information regarding them. However, in these cases, when the investigation has progressed sufficiently far, the Bureau will be pleased to furnish technical data to those engaged in the particular application of the subject, in order to avoid the delay incident to publication.

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1 Tests of Hollow Tile and Reinforced Concrete Floors

Sometime ago the Bureau of Standards conducted an investigation of the stresses in certain of the floor panels of the Arlington Building, Washington, D. C. This building was designed for use as an hotel, but was purchased by the Government and occupied by a branch of the Treasury Department. This change of occupancy considerably increased the live load which was taken care of by an additional layer of concrete on top of the floor panels. These panels are constructed of hollow tile and reinforced concrete supported on reinforced concrete beams. The tests are of unusual interest because they were among the first made on this type of construction and because of the provision above mentioned for carrying the additional load.

The test loads, consisting of bags of cement, were designed to produce the maximum positive and negative moments. Strain measurements were taken of the concrete and the reinforcing steel of the slabs and girders. In addition the deflections of the slab were measured, and it was found that the maximum stresses were developed at the positions of negative moment in the vicinity of the supporting beams. The beams at the edges of the panels

offered so little resistance to torsion that the stresses in the steel across these beams, due to negative moment, were but little affected by transfer of load between adjacent panels. While under load, the effect of time was very pronounced during the first 20 hours and comparatively small later. The increase in the deformation, due to continued loading, was greater in the reinforcement than in the concrete. The cracking of the concrete and the resulting great increase of the stresses in the reinforcing steel show that at first the concrete carried a considerable portion of the tensile stresses.

The moment coefficients were generally small, and the Bureau does not suggest them for use in design, but simply to show the relative amount of the bending moment carried in the two directions. The effect on the moment coefficient of an increase in ratio of length to width of the panel was a rapid increase of both positive and negative moments in the direction of the short span and a less rapid decrease of both moments in the direction of the long span. The factor of safety of the structure was apparently greater than 2.

This investigation is described in Technologic Paper No. 236 of the Bureau of Standards which can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 15¢ a copy.

2 Penetration Tests for the Workability of Concrete Mixtures

The Bureau has recently completed the laboratory work in connection with the development of a penetration test for the workability of concrete mixtures, and a paper has been prepared and approved for publication. This describes the penetration test for measuring workability as distinguished from consistency or flow. If workability is defined as that property of a concrete mixture upon which depends the amount of work required to handle and distribute the concrete uniformly, the indications of the test seem to be correct.

The outstanding results obtained from the penetration test in this investigation are: (a) The relative effects of celite, kaolin, hydrated lime, and other admixtures upon the workability of the concrete have been determined; (b) the workability of concrete mixtures varies only moderately with change in consistency or flow and is more dependent upon the character and proportions of the solid ingredients than upon the quantity of mixing mortar; (c) the workability of concrete mixtures shows a maximum of medium wet consistency; (d) the workability of concrete mixtures depends upon two factors, segregation and lubrication, either one of which may be controlled by suitable changes in the ingredients of the concrete.

3 The Effect of Accelerators on Reinforcing Steel

A number of 1:2:4 concrete and 1:3 mortar specimens in which steel rods have been embedded were broken during the past month, and an examination made of the rods. Calcium chloride solutions had been used for some of the specimens as the gaging liquid. An examination was also made of expanded metal which had been embedded in small slabs prepared from mortar gaged with a proprietary compound of the accelerator type.

Some of the foregoing specimens were 5 and others 6 years old and all had been stored out of doors and exposed to the weather. From this examination, it is concluded that while calcium chloride tends to corrode the reinforcement, the corrosion does not seem serious or of a progressive nature with age, in cases where the reinforcement is completely embedded in the concrete. However, when using accelerators care should be taken to completely coat and embed the reinforcement and avoid pockets near it. The strength of the specimens which had been exposed to the weather was considerably higher when calcium chloride had been used than when it had not been employed. Sufficient specimens remain to allow another examination at a later date, and a comparison of the rod condition and strength will be made at different ages.

4 Stucco Investigation

For several years past, the Bureau of Standards has been studying stuccos, and many of its findings have been embodied in a "Recommended Practice for Portland Cement Stucco" which was formally adopted recently by the American Concrete Institute as one of its standards. The practice covers the application of stucco to all bases, and although a masonry base is probably capable of giving the most dependable results, it is recognized that there has been and probably will be for many years to come a larger use of stucco on frame houses than on masonry structures.

The application of stucco to frame houses involves greater uncertainties in results than on masonry bases, and in order to solve some of these problems, the Bureau proposes to carry out, in cooperation with some of the interested trade associations, a study involving about 30 test panels on the stucco test building. Considerable interest has been shown in this work, and a conference will probably be held in the near future. If the full cooperation of the interests involved is secured, it is planned to start work early in the Fall.

5 Weathering Tests of Stone

During the past month, progress has been made on the freezing tests of sandstone and limestone. The studies being made on samples of sandstone from the old Government quarries at Aquia Creek, Va., indicate that by careful selection a reasonably good grade of stone can be obtained

for ordinary structural uses. This deposit has not been operated since the construction of the oldest Government buildings in Washington, such as the White House and the original portion of the Capitol. A new company is now preparing to work the quarry.

6 Fatigue Tests of Limestone.

This work has been briefly mentioned in the last two numbers of the Bulletin. Tests on beams of limestone which are continuously loaded to a stress of two-thirds of the breaking load have shown practically no increase in deflection during the month. Apparatus is being constructed for making fatigue tests on stone under direct compression.

7 Investigation of Corrugated Zinc Roofing

In connection with an investigation of the properties of zinc roofing, cold tests were made during the past month on zinc nails and rivets. These were driven at room temperature, cooled to a low temperature by liquid air, and warmed up again to room temperature without producing any appreciable change. Driving the nails at temperatures from 0 to -40°C developed a brittleness in most of the nails, the heads flying off of those without fillets. In the case of nails with fillets, the heads did not break off. At -35 to -40°C, some of the zinc sheet became brittle and cracked when pounded.

The Bureau has requested those interested to submit a greater variety of samples to determine what types, if any, will endure such a test.

8 Fire Tests of Roofing Materials

The Bureau has prepared a program of tests, equipment is being procured, and test specimens constructed for conducting a series of fire tests of roofing materials with particular reference to the relative merits of wood shingles and prepared roofing.

A conference has been held with representatives of the wood shingle manufacturers, the prepared roofing manufacturers, and the fire underwriters, at which agreement was reached on the methods of testing and on an outline of the program of tests.

9 Tests of Parts of the New Delaware River Bridge

As mentioned sometime ago in the Bulletin, the Bureau is conducting a cooperative investigation with the Joint Commission of Pennsylvania and New Jersey on the strength of certain members of the new bridge across the Delaware River between Philadelphia and Camden. The general problem in hand is the compressive strength of web plates; and it has been found, as might be expected, that the strengths are a function of the properties of the material. A special study is now under way on the relation between the properties and certain metallurgical phenomena which have been developed during the investigation.

10 Non-Destructive Testing of Wire Rope

Item 8 of Bulletin No. 74 briefly mentioned the work which the Bureau of Standards has undertaken on the development of a non-destructive method for testing wire rope. In connection with the investigation, a conference was held on June 16 at which the various interests concerned were represented. It was the sense of the conference that magnetic methods of testing appeared to be most promising and that a large part of the investigation should be directed along that line, although various other methods which may show possibilities should not be overlooked.

11 Resistance to Bending of Cordage

The Bureau of Standards has finished the construction of a small bending machine for measuring the resistance to bending of cordage yarns, and work on this investigation has been started. A program has been drawn up which is very extensive and is of special interest to manufacturers.

12 Logging and Sawmill Safety Code

For several years, the Bureau has taken a leading part in the preparation of a safety code for logging and sawmill operations. The work is now practically completed and is ready for publication. It has been approved by the committee which has been cooperating with the Bureau and will, no doubt, be widely accepted as a standard of practice in the logging industry. This code covers the felling of timber, its transportation to the mill, its manufacture into rough dimension lumber, and the operation of dry kilns. It will, of course, be of special interest in those sections of the country which are large lumber producers, such as the Southern pine belt, the Pacific Northwest, and the Great Lakes district.

13 Aeronautical Safety Code

A meeting of the subcommittee on lighter-than-air craft of the Aeronautical Safety Code Committee was held at the Bureau of Standards, and final drafts of the parts of the code dealing with balloons and airships were completed, while that portion of the draft dealing with parachutes was prepared for general circulation. A meeting of the sectional committee was also held at the Bureau and parts of the code were approved which relate to balloons, airships, and landing fields.

14 Types of Aeronautic Instruments

The Bureau of Standards has just issued Technologic Paper No. 237 on Types of Aeronautic Instruments. Copies can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 20¢ each.

This paper describes the various instruments ordinarily used on the modern air craft and will be found useful to all those interested in the aeronautic instrument art. The instruments considered in this paper are as follows:

Altitude instruments, including altimeters, barographs, and statoscopes; speed instruments, including air speed indicators, ground speed indicators, and rate-of-climb indicators; orientation instruments, such as compasses, turn indicators, and inclinometers; engine instruments, among which may be mentioned tachometers which are used to indicate the number of revolutions of the propeller, pressure gages, gasoline gages, gasoline flow indicators and thermometers; and navigating instruments, including maps, dead-reckoning instruments, astronomical instruments, and the radio direction finder.

Among the special instruments and accessories described in this paper are oxygen instruments, recording instruments, strut and gas temperature thermometers, the strut thermometers being used to indicate the temperature of the surrounding air, while gas thermometers are employed on lighter-than-air craft to give the temperature of the gas in the bag. Other instruments described include clocks and watches which are carried on nearly all air craft and which must be capable of withstanding shocks of landing and severe vibration, manometers and hydrogen leak detectors, employed entirely on lighter-than-air craft to control the pressure of gas in the bag and to indicate leakage.

The paper is profusely illustrated with photographs of the latest types of aeronautic instruments.

15 Motor Vehicle Lighting

The chief of the electrical division of the Bureau attended one session of the Society of Automotive Engineers at Spring Lake, N. J., on June 21, at which the problem of headlighting for motor vehicles was discussed. The preponderance of opinion was that so far as specifications or laboratory tests of headlight devices are concerned the present status is fairly satisfactory. It is, however, essential that more effective means be found to control the condition of headlights in actual use.

16 Life Tests and Inspection of Electric Lamps

As during the fiscal year 1922, the quantity of lamps ordered by Government departments during the fiscal year ended June 30, 1923, was considerably smaller than for several years preceding. The total number was about 1 355 000 lamps valued at $353 000.00; the average cost per lamp being about 26¢ as compared with 30.4¢ in 1922. This difference in unit cost is largely accounted for by two reductions in the price of tungsten lamps made during the year. Of the total number of lamps purchased, 86% were large tungsten lamps as distinguished from miniature and carbon lamps. The corresponding percentage in 1922 was 79. The increase in tungsten lamps was largely in the vacuum type and was due to the adoption of mill-type tungsten lamps instead of the carbon lamps formerly used extensively by the Navy Department. The quantity of carbon lamps was

thus reduced to about 3 1/2% of the total. Of the large tungsten lamps 15.4% in number and 33.3% in cost were of the gas-filled type.

Since several large orders placed late in the fiscal year 1922 were inspected during the current year, more lamps were inspected than were actually ordered during the year; the total being about 1 660 000. As samples representing these inspected lamps, there were subjected to life tests at the Bureau during the year 1418 tungsten, 214 gas-filled tungsten, and 74 carbon lamps, a total of 1706.

17 Methods of Measuring the Properties of Electrical Insulating Materials

Scientific Paper No. 471 of the Bureau of Standards, which can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 15¢ a copy, describes methods of measuring the properties of electrical insulating materials. This paper gives a series of electrical, thermal, chemical, and mechanical test methods which have been found useful in the study of solid electrical insulating materials. The several tests described are those used in obtaining the data previously reported in Technologic Paper No. 216 of the Bureau of Standards entitled "Properties of Electrical Insulating Materials of the Laminated Phenol-Methylene Type." The several test methods described are radio-frequency phase difference or power loss, dielectric constant and flashover voltage, direct-current surface resistivity and volume resistivity, tensile strength, modulus of elasticity (tensile), proportional limit, modulus of rupture, modulus of elasticity (transverse), Brinell hardness, scleroscope hardness, resistance to impact, permanent distortion, density, moisture absorption, machining qualities, thermal expansivity, and the effects of heat, acid, and alkali.

The methods and apparatus are described in some detail; first, so that the data in Technologic Paper No. 216 will be definite and be capable of being correctly compared with other data; second, so that any of the tests may be reproduced by others.

18 Standard Telephone Equipment for Government Departments

The chief of the telephone section of the Bureau has been appointed chairman of a committee of various department representatives designated to consider for the Federal Specifications Board the desirability of preparing standard government specifications for the purchase of telephone equipment. A preliminary meeting of this committee has disclosed the fact that the government owns and operates a large number of small telephone systems using equipment of various types and manufacture. The annual expenditures for replacement and additions, estimated on the present quantity of material in use, warrants the preparation of standard specifications for purchase, and the Federal Specifications Board has been so informed.

19 Tests of Radio Receiving Sets

The results of tests of radio receiving sets by the Bureau of Standards are given in a series of Letter Circulars of which the first (No. 90) was mentioned in item 9 of Technical News Bulletin No. 73. This paper dealt with tests of electron tube sets. The second circular of this series (No. 93) is now ready for distribution and gives the results of tests on crystal detector sets.

It is believed that the methods followed and the examples given in these reports will be of assistance to manufacturers in the development of methods of testing besides aiding them to properly describe and improve their products. The particular receiving sets are referred to by arbitrary reference numbers rather than by manufacturer's name and type and model numbers. As these circulars are only available in mimeographed form, the supply is limited; but copies can be obtained by those directly concerned with the testing of receiving sets by addressing the Bureau of Standards.

20 Use of Kilocycles in Radio

The Second National Radio Conference, which met last March, introduced a method of designating radio waves which may not be familiar to all those interested in radio work. This is the use of frequency in kilocycles (abbreviated kc) instead of wave length in meters. This practice has many advantages, and it is believed that it will eventually replace the other method of designation.

The separation of the frequencies of transmitting stations to prevent interference is an important matter, and the necessary separation as expressed in frequency is the same no matter what the frequencies of the two stations may be, while it is variable and quite misleading when expressed in meters. Thus, the frequency band existing between 150 to 200 meters (2000 to 1500 kc) is enormously wider than the band from 1000 to 1050 meters (300 to 286 kc). While it is possible to carry on 50 simultaneous radio telephone communications between 150 and 200 meters, only one could be carried on between 1000 and 1050 meters.

It is very simple to obtain the approximate relation between kilocycles and meters. For example, knowing the wave length in meters, divide 300 000 by the number of meters to obtain the frequency in kilocycles, or knowing the wave length in kilocycles, divide 300 000 by the number of kilocycles which will give the wave length in meters. A table which may be used for rapid and accurate conversion can be obtained from the radio laboratory of the Bureau of Standards.

21 Continuous Wave Radio Transmission on on a Wave Length of 100 Meters Using a Special Type of a Wave Length of 100 Antenna

A paper entitled "Continuous Wave Radio Transmission on a Wave Length of 100 Meters Using a Special Type of Antenna" was published in the Proceedings of the Institute of Radio Engineers for June, 1923. This gives results of work carried out by the Bureau of Standards in which

an electron tube transmitting set with 450-watt tubes was employed with a special form of antenna having a rectangular shape 18 feet high and 40 feet long. A special 100-meter receiving set is also described which was developed in connection with the transmission test employing this antenna. This method was successfully used for communication between Washington and Pittsburgh, and it was found that daylight communication was practically as good as at night and but little fading occurred. Tests were made at Dayton, Ohio, in transmitting with this set from the ground to an airplane in flight and the directional characteristics of the antenna were determined.

22 Reducing the Guesswork in Tuning

The chief of the radio section of the Bureau of Standards has published in the July issue of Radio Broadcast an article "Reducing the Guesswork in Tuning" which gives a general statement of the methods employed in establishing frequency standards and making them available to the public.

As previously mentioned in the Bulletin, the Second National Radio Conference recommended that radio broadcasting and other transmitting stations operate accurately on the frequencies to which they are assigned. The attainment of the necessary accuracy is made possible by improvements which have been carried out during recent months at the Bureau of Standards in its frequency measurements. Standards of frequency can now be furnished which permit the setting of transmitting stations on the correct number of kilocycles. The fundamental frequency basis has been established by four independent methods of primary standardization. The frequency standards are furnished through the transmission of the standard frequency signals which have been described in the last two numbers of the Bulletin, in the testing of wave meters, and in the measurement by the Bureau of frequency of various transmitting stations, the frequencies of which are known to be kept constant.

23 Street Lighting

As previously mentioned in the Bulletin, the Bureau of Standards is making a study of the various systems of street lighting used in cities and towns throughout the country. This work is now well under way and is receiving the hearty cooperation of municipalities and operating utilities. Several hundred replies to questionnaires on engineering practice and contract requirements have been received and are being carefully analyzed. Very full engineering data have been furnished by thirty or more of the larger operating companies on the basis of which a survey of the best practice is being prepared as a part of a comprehensive report on street lighting service.

24 Crystalline Form of Electrodeposited Metals

A paper entitled "Notes on the Crystalline Form of Electrodeposited Metals" has been prepared by members of the Bureau's staff for presentation at the Fall meeting of the American Electrochemical Society. The purpose of this paper is to present a simple theory on the mechanism of electrodeposition and a classification of structures which the Bureau believes will be helpful in further studies in this field.

The paper is of special interest in emphasizing the large amount of work still to be done upon the fundamental principles of electrodeposition and the need of applying all possible methods of attack, including the study of microstructure and x-ray analysis. It is hoped that during the next few years there will be an opportunity for more extensive study of these fundamental principles.

25 Absorption of Gases in Water and Solutions

For some time the Bureau has been working on the absorption of gases and has obtained some very interesting data on the absorption of oxygen in water and of carbon dioxide in sodium carbonate solutions. The result of the latter determination was unexpected and showed that carbon dioxide dissolved less rapidly in normal carbonate solutions than in pure water, in spite of the possibility of the formation of bicarbonates. In order to determine how much of this defect was caused by the viscosity of the absorbent solutions, similar determinations were made of aqueous solutions of sugar having the same viscosity as the sodium carbonate solutions. The effect of the carbonate in decreasing absorption still remained however.

26 Diffusion of Nitrogen Through Various Liquids

One of the difficulties which the Bureau of Standards has encountered in liquefaction of hydrogen is the securing of hydrogen of sufficient purity. If other gases are present, they become frozen at a temperature higher than that at which hydrogen liquefies. This clogs up the apparatus and stops the process. The storing of hydrogen in any kind of a gas holder is, therefore, a matter of some difficulty because gases are very apt to diffuse through the liquid seal used in the holder and become mixed with the hydrogen.

Experiments were made during the past month on the relative rates of diffusion of nitrogen through glycerine, machine oil, and water. It was found that the rate of diffusion through glycerine is very much lower than through water or machine oil. This was to be expected because of the extremely low solubilities of nitrogen and other gases in glycerine. The Bureau now proposes to employ glycerine as a seal for the gas holder used for the temporary storage of pure hydrogen.

27 The Form of Oxygen in Steel Determined by Vacuum Fusion Analysis

Previous tests have indicated that oxygen existing in iron or steel as iron oxide or silica is completely determined by the vacuum fusion method of analysis for gases in metals. Additional tests have been made with oxides of manganese and aluminum, the results showing a recovery of over 90% of the oxygen in either of these oxides, the oxides used in such tests being in comparatively coarse particles.

It has been shown, both in these tests and by previous investigators, that the reduction of such oxides by carbon is more complete the finer the oxide. It is, therefore, believed that such oxides contained in steels as very fine inclusions are completely reduced in the vacuum fusion method of analysis.

28 Nick-Bend Tests of Wrought Iron

Previous work on this subject by the Bureau has shown that the character of the crystalline areas which are often obtained when wrought iron bars are fractured by the nick-bend test is determined largely by the relative size and distribution of the slag threads. In general the smaller the slag threads and the more uniformly they are distributed, the greater is the tendency for crystalline areas to occur.

In order to confirm this tentative conclusion, considerable attention has been given to the nick-bend test of open hearth iron. It was noticed that the full-sized bars broken in the regular manner of the nick-bend test invariably gave crystalline fractures. The observations previously made on the difference in the nature of the crystalline break on the tension and compression sides of the bar were also confirmed. On the other hand, a large number of the small impact specimens cut from such bars and tested by the Izod and Charpy methodsgave silky fractures. Evidently, the nick-bend test should not be considered merely as an impact test of the Izod and Charpy typeson a large scale.

By annealing impact specimens of the open hearth iron at high temperatures up to and including 1150°C, which renders the grain size larger and more uniform, the fractures obtained in the impact test were very similar to those in the simple nick-bend test of the untreated iron. However, some of the bars annealed at high temperatures still showed a silky fracture after the Charpy impact test. It appears probable, therefore, that the resistance of the iron to shock is not determined simply and wholly by the grain size; but that other features, such as the form of the grain, particularly the character of the junction between neighboring grains, may affect the results. Microscopic examinations of fractured specimens are being made to throw light upon this.

29 The Quenching of Oil-Water Emulsions on Gage Steel

Considerable time was devoted during the past month to a study of the characteristic behavior of an oil-water emulsion (a mixture used commercially to some extent) as a quenching medium in the heat treatment of steels.

It was found necessary to stir the mixture with high pressure air to obtain a homogeneous emulsion in which condition it was very stiff and cooled the specimen much more slowly in the upper temperature range than oil. It had the peculiar property of cooling slowly half way and then very rapidly, the time to cool to one-tenth of the temperature range being about the same as for oil. This unique property is evidently due to entrapped air and should be studied further. When completely emulsified, it was not possible to harden standard cylinders of 1.4% chrome steel though they could be hardened if the mixture was not thoroughly emulsified.

30 Additional Foundry Equipment

Up to the present time, nearly all the work of the Bureau's foundry has been limited to the preparation of non-ferrous alloys. Recently the Bureau has purchased a small cupola to be used for investigational purposes in connection with the ferrous alloys and also to provide metal for castings used by the Bureau and other branches of the government. During the past month, the construction of a charging platform and foundations for the cupola were completed. The installation and lining of the cupola are now in progress and the equipment will soon be ready for service.

31 Standardization of Paper

On June 19, there was held at the Bureau of Standards a conference having for its object the reduction of the number of sizes and kinds of paper which have been carried in stock as well as the standardization of nomenclature, and testing methods. The conference was attended by manufacturers, merchants, and users of paper.

Six committee reports, which had been submitted to the Bureau, were placed before the conference, and they were accepted unanimously as a basis for further action. A list of the standard sizes of sheets and widths of rolls was proposed and approved, and lists of sizes for each kind of paper will be submitted for approval to the industries making and using such paper.

When the standard sizes are finally adopted, these sizes will be regularly carried in stock by dealers, other sizes being made to special order only. This will reduce very much the amount of stock which must be carried by dealers and will decrease their overhead charges. It will also result in a more efficient utilization of the mills and in more prompt delivery of orders of standard sizes. The users will benefit by the change as they will be able to get paper to meet their needs on much shorter notice.

32 Cooperation with Manufacturers and Users of Weights

During the past few months, the Bureau of Standards has been experimenting with a new practice of issuing certificates for sets of weights with the object of helping the maker or dealer, as well as the purchaser, to secure weights certified by the Bureau with the least possible delay. In the past when some of the weights in a set have not come within the Bureau's tolerance, the whole set has been rejected. Now, when it is found necessary to remove 1 to 3 weights from a set because of errors greater than the prescribed tolerances, the certificate is issued covering only those which meet the test requirements. The maker or dealer can then submit for separate test the weights necessary to complete the set, thus a complete certified set can be made up without retesting any of the satisfactory weights. By handling each shipment independently, the Bureau avoids repacking weights for replacements, the care of large numbers of sets awaiting replacements, and thus gives to the maker or dealer quicker service. While this makes necessary the shipment by the manufacturer or dealer of such a set in two packages with two certificates, this does not seem an unreasonable hardship in view of the other advantages which this system brings about.

When this new procedure was first proposed, some opposition to it was experienced, but as practically all dealers and makers now seem greatly pleased with the results, it is hoped that this system can be adopted as standard before long.

PUBLICATIONS OF THE BUREAU OF STANDARDS RELEASED DURING JUNE.

Scientific Papers

S 470 A method for the accurate measurement of short-time intervals. H. L. Curtis and R. C. Duncan 10¢

S 471 Methods of measurement of properties of electrical insulting materials. J. H. Dellinger and J. L. Preston 15¢

Technologic Papers

T 236 Loading test of a hollow tile and reinforced concrete floor of Arlington Building, Washington, D. C. Louis J. Larson and Serge N. Petrenko 15¢

Circulars

C 139 United States Government Specification for Dry Cells. (U. S. Government Standard Specification No. 58)

These publications can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. at the prices given above.

Respectfully,

George K. Burgess, Director

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